

REMARKS

ADVISORY ACTION

In the Advisory Action, dated October 1, 2009, the Office stated that the amendment to independent claim 18 filed after final rejection will not be entered because the amendment changes the scope of the claims, requiring further consideration and a new search.

Additionally, the Office stated that it does not agree with the Applicant's argument that Reeh (US 2001/0000622) (hereafter "Reeh") does not teach a hemispheric conversion material region. Reeh was cited by the Office as anticipating claims 1-3, 5-17, and 32-48.

In response, the Applicant has submitted herewith a Request for Continued Examination, as well as arguments in support of patentability of the claims.

CLAIM REJECTIONS

35 USC §102

Claims 1-3, 5-17, and 32-48

Claims 1-3, 5-17, and 32-48 are rejected under 35 U.S.C. 102(b) as being anticipated by Reeh. Claims 1, 32, and 44 are independent claims from which claims 2, 3, 5-17, 33-43, and 45-48 depend. Although the Applicant disagrees with the Office's determination regarding patentability, independent claims 1 and 32 have been amended to more fully describe the subject matter therein. Claim 3 has been canceled.

Independent Claim 1

Claim 1, as amended, requires a "hemispheric conversion material region formed separately from said light source and including conversion particles uniformly distributed throughout." Applicant submits that Reeh does not teach or disclose this element.

In the Advisory Action, the Office asserts that Reeh teaches the hemispheric conversion material region of claim 1, stating:

[L]ens (29) may be formed on a side surface of component (4) or be designed as the component part of the luminescent conversion layer (4)...in which case the conversion particles will be dispersed 'throughout' the covering. (Advisory Action: Page 2).

The Office cites paragraph [0091] of Reeh in support. Paragraph [0091] describes the structure of FIG. 2 in Reeh:

This covering 29 in the form of a lens may be composed of transparent plastic or glass and be bonded, for example, onto the luminescence conversion layer 4 or be designed directly as the component part of the luminescence conversion layer 4.

The Office argues that when covering 29 is designed directly as the component part of the luminescence conversion layer 4, conversion particles will be dispersed throughout the covering 29. Thus, the Office assumes that because the covering 29 and the conversion layer 4 can be fabricated as a single component part that the conversion particles would necessarily be

dispersed throughout that component. The Applicant submits that Reeh does not support this assumption.

Reeh does not include any figures or any discussion of embodiments including a hemispheric conversion material region. Instead, Reeh illustrates embodiments having a luminescence conversion layer 4 with constant thickness. (See Reeh: FIGs.2-4, 6). Reeh explains that having a constant thickness in the conversion layer 4 is important "to ensure a uniform color of the radiated light." (Id. at Page 2, paragraph [0019]). The efficacy of this approach notwithstanding, if the covering 29 were to include conversion material, the resulting luminescence conversion layer would not have a constant thickness. Thus, if anything, the disclosure in Reeh implies that the conversion particles would not be distributed uniformly throughout an element combining the covering 29 with the luminescence conversion layer 4. Reeh simply does not support the assumption made by the Office in the Advisory Action and does not teach all the limitations of claim 1. Claim 1 is otherwise allowable.

Claims 2 and 5-17 depend from allowable claim 1 and are allowable for at least the same reasons as claim 1.

Note on Hemispherical Lens Geometry

The Office requested an explanation of how the hemispheric shaped conversion material region of claim 1 provides a structure wherein the light passing through travels through a same thickness of conversion material. If the light source is approximated as a point source (as is common in lens design), and the source is proximate to the interface with the lens, then a hemispherical geometry dictates that all rays emanating from the point source will trace out equidistant paths as they exit

the lens (i.e., all radii from the center of a sphere have the same length). If the conversion region is flat, as the luminescence conversion layer shown in FIGS. 2 and 3 of Reeh, although the layer has a constant thickness, light emanating radially from the source will not travel through the same amount of conversion material as it exits the layer. Thus, by uniformly distributing the conversion particles throughout a hemispherical lens, the rays from the light source pass through the same amount of conversion material before they are emitted. This ensures that the light has the same probability of conversion regardless of the initial angle of emission from the source, providing a more uniform color distribution in the output profile across the entire range of viewing angles.

Independent Claim 32

Claim 32 has been amended and contains limitations similar to claim 1. Applicant submits that the arguments for patentability of claim 1 apply to claim 32 with equal force.

Reeh does not teach all of the limitations of claim 32. Claim 32 is otherwise allowable.

Claims 33-43 depend from allowable claim 32 and are allowable for at least the same reasons as claim 32.

Independent Claim 44

Claim 44 contains limitations similar to amended claim 1. Applicant submits that the arguments for patentability of claim 1 apply to claim 44 with equal force.

Therefore, Reeh does not teach all the limitations of claim 44. Claim 44 is otherwise allowable.

Claims 45-48 depend from allowable claim 44 and are allowable for at least the same reasons as claim 44.

Claims 18-21, 23, 24, and 27-31

Claims 18-21, 23, 24, and 27-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Odaki (US 2001/0050371) (hereafter "Odaki"). Claim 18 is an independent claim from which claims 19-21, 23, 24, and 27-31 depend. Although the Applicant doesn't necessarily agree with the Office's determinations regarding patentability, claim 18 has been amended to more fully describe the subject matter therein.

Independent Claim 18

Odaki does not disclose all the limitations of claim 18. Amended claim 18 requires "first and second electrical contacts on opposite surfaces of said light source" and a "conversion material region comprising a phosphor loaded cap perforated to allow said first contact to be housed within said phosphor loaded cap." Support for this amendment is found, for example, at US 2005/0093430 (Page 5, paragraph [0070]; FIGS. 15 and 16), which states:

a contact is deposited on the LED's bottom surface and another contact is deposited on the LED's top surface. The cap is perforated on its top surface and when it is bonded to the LED the top contact is housed in, and accessible through, the perforation.

Odaki does not teach or disclose a first and second contact on opposite surfaces of the light source nor a perforated phosphor loaded cap as required by claim 18. Instead, Odaki

discloses an LED device having a fluorescent substance, containing a phosphor, in the form of a layer that is placed on an outer surface of the light-emitting element. (Odaki: paragraph [0048] and FIG. 1B). The Office refers to fluorescent layer 2' in FIG. 1B of Odaki as being analogous to the conversion material region of claim 18. However, fluorescent layer 2' is not perforated as required in claim 18. Furthermore, none of the remaining embodiments in Odaki teach the conversion material region of claim 18, because the members containing the phosphor material are not perforated to interface with the first contact as required by claim 18.

An advantage of the perforated phosphor loaded cap in claim 18 is that this configuration allows "top contact 158 [to be] arranged within, and accessible though, top perforation 160" after the phosphor loaded cap is bonded to the light source. (US 2005/0093430: Page 5, paragraph [0066]). Furthermore, the conversion material region, in claim 18, comprising the phosphor loaded cap is formed separately from the light source, and this allows for the emitter to be tested prior to bonding the phosphor loaded cap to the light source. (Id. at paragraph [0069]). If the emitter has substandard emission or is otherwise defective, then a determination can be made as to whether the light source or phosphor loaded cap is defective. (Id.). The faulty component can then be discarded and substituted with a new component. The replacement process avoids the waste associated with the conventional manufacturing processes where the entire emitter is discarded if the emission is substandard. In Odaki, the resin composition containing red phosphor 4 is formed on the substrate by molding the resin into the desired shape. (Odaki: Page 3, paragraph [0050]). Thus, the resin composition is not formed separately from the light

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source, but is formed after the resin is deposited on the substrate and molded into the desired shape.

Odaki does not disclose all the limitations of claim 18. Claim 18 is otherwise allowable.

Claims 19-21, 23, 24, and 27-31 depend from allowable claim 18 and are allowable for at least the same reasons as claim 18.

Applicant requests that the rejection of claims 1, 2, 5-21, 23, 24, and 27-48 under 35 U.S.C 102 be withdrawn.

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CONCLUSION

Applicant respectfully submits that claims 1, 2, 5-21, 23, 24, and 27-48 are allowable and request that a timely Notice of Allowance be issued in this case.

Respectfully Submitted,

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